

A Comparative Capability Assessment of Contemporary Business Intelligence and Data Visualization Platforms

Sandipkumar B. Surati¹, Megha D. Rana¹, Amitkumar R. Patel²

¹ Vivekanand College for Advanced Computer and Information Science, Surat 395005, Gujarat, India

² Computer Science Department, Gujarat University, Ahmedabad, Gujarat 380009, India
sbsurati@gmail.com¹; megha311083@gmail.com¹; iamitrp@gmail.com²

Abstract: Business Intelligence (BI) platforms increasingly combine data connectivity, preparation, modeling, visualization, analytics, natural-language interaction, collaboration, and deployment within integrated environments. This study presents a comprehensive comparative capability assessment of five widely used BI platforms—Zoho Analytics, Microsoft Power BI, Tableau, Domo, and Qlik. To ensure rigor and reproducibility, the evaluation defines eight common capability dimensions and explicit operational indicators for each dimension. Evidence is synthesized from peer-reviewed literature and detailed vendor documentation. A three-level evidence-based coding scheme—High (5), Medium (3), and Basic (1)—is applied alongside lifecycle-weighted criteria to compute a Weighted Capability Index (WCI). The baseline evaluation yields scores of 5.00 for Power BI, 4.70 for Domo, 4.60 for Qlik, 4.50 for Zoho Analytics, and 3.80 for Tableau. Systemic sensitivity analysis (± 5 percentage points across all criteria) reveals rank stability for Power BI (1st) and Tableau (5th), while mid-tier ranks shift depending on specific modeling and NLP priorities. The paper provides a transparent comparative model for academic researchers and enterprise decision-makers.

Keywords: Business Intelligence, Data Visualization, Power BI, Tableau, Zoho Analytics, Domo, Qlik, Capability Assessment, Natural-Language Analytics, Enterprise Architecture

1. INTRODUCTION

The rapid expansion of digital enterprise data has intensified the demand for technologies capable of converting heterogeneous organizational data into actionable analytical insights. Organizations collect data across relational databases, cloud data warehouses, SaaS applications, flat files, and real-time event streams. Business Intelligence (BI) and data visualization supply the vital analytical bridge between raw data ingestion and executive decision-making by empowering users to structure, examine, and visually interpret complex information streams [1]–[4].

Modern data visualization has evolved significantly beyond conventional static charts toward interactive, multi-dimensional analytical interfaces [1]–[3]. Consequently, contemporary BI suites integrate comprehensive capabilities spanning automated data preparation, semantic data modeling, interactive dashboarding, natural-language querying, and artificial intelligence (AI)-assisted insights. Understanding how these components interoperate across enterprise workflows is essential for evaluating platform efficacy.



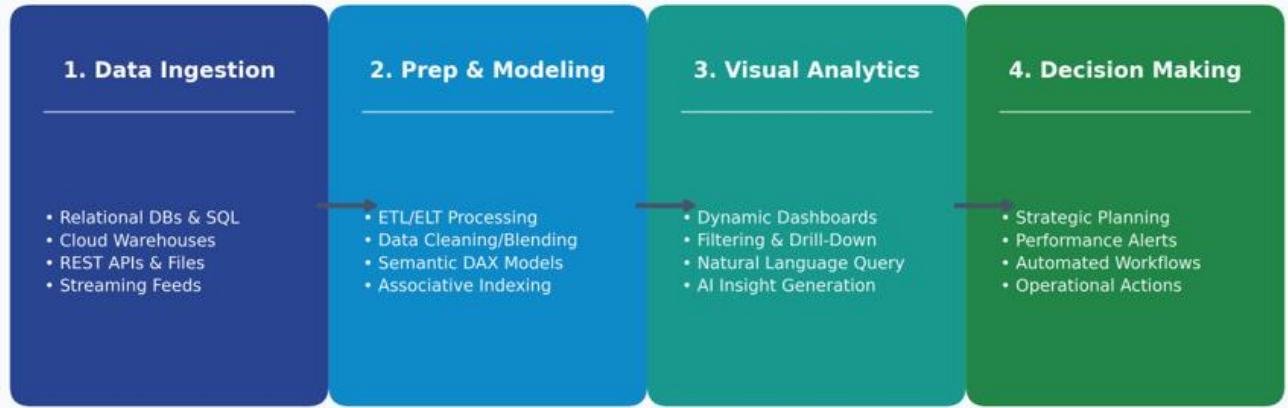


Figure 1: Data-to-Insight-to-Decision BI workflow Framework

As illustrated in Figure 1, the end-to-end analytical lifecycle progresses from multi-source data ingestion through automated data preparation, semantic modeling, visual analytics, and operational decision-making. Different BI vendors prioritize different stages within this workflow. Evaluating platforms through a single feature yields an incomplete assessment. This study conducts a rigorous comparative capability analysis of Zoho Analytics, Microsoft Power BI, Tableau, Domo, and Qlik across eight unified capability dimensions.

2. RESEARCH QUESTIONS

To guide this evaluation, the study addresses four core research questions:

RQ1: What key operational capabilities define contemporary BI and data visualization platforms across the data lifecycle?

RQ2: How do Zoho Analytics, Microsoft Power BI, Tableau, Domo, and Qlik differ when evaluated against unified, evidence-based capability dimensions?

RQ3: What methodological framework effectively synthesizes heterogeneous vendor documentation and literature into reproducible evaluation metrics?

RQ4: How robust is a weighted capability index against systematic perturbations in criterion weights?

3. RELATED WORK

Early BI research focused primarily on data warehousing architectures, database query optimization, and static reporting systems. Basic and Fadlalla [1] established an integrative framework linking visualization dimensions to visual intelligence capabilities. Cawthon and Moere [2] surveyed business visualization techniques, emphasizing the role of interaction design in exploratory data analysis. Human factors and cognitive interface mechanics were further investigated by Tory and Möller [3].

In dashboard research, Yigitbasioglu and Velcu [5] examined the impact of functional design on performance management systems. Formal visual design models, such as Draco [6], formalize visualization knowledge as soft and hard constraints. Scalability in high-dimensional data visualization was addressed by Borkin et al. [7]. More recently, research has tracked the convergence of AI and BI into augmented analytics [8].



Figure 2: Evolution of BI and Data Visualization Across Technical Eras

Figure 2 contextualizes the technical evolution of BI systems across three major eras: from 1990s IT-centric SQL reporting to 2010s self-service visual discovery and contemporary augmented, cloud-native analytics. The current study extends existing literature by delivering a side-by-side empirical evaluation of complete commercial BI ecosystems.

4. METHODOLOGY

This evaluation utilizes a transparent, four-phase comparative assessment design: (1) evidence collection from peer-reviewed literature and vendor documentation; (2) dimension operationalization; (3) 3-level evidence-based coding; and (4) mathematical synthesis via a Weighted Capability Index (WCI) with sensitivity testing.

A. Evidence Protocol and Data Sources

Evidence was gathered across academic repositories, official product documentation, whitepapers, and independent research reports. Table 1 details the evidence protocol utilized across the five evaluated platforms.

Table 1: Evidence Protocol across Evaluated Platforms

Platform	Documented Evidence and Technical Scope
Zoho Analytics	Release documentation detailing Ask Zia natural language engine, Zia Insights auto-narration, multi-source ingestion, and automated predictive modeling [9], [10].
Microsoft Power BI	Official documentation covering Power Query ETL, DAX semantic modeling, Q&A natural language interaction, AI visual insights, and Service/Desktop deployment [11].
Tableau	Product technical specifications covering Tableau Prep, Ask Data natural language queries, workbook optimization, and Cloud/Server visualization infrastructure [12]–[14].
Domo	IDC MarketScape assessments and technical whitepapers detailing Domo Business Cloud, Magic ETL, AutoML integrations, and cloud collaboration workflows [15].
Qlik	Technical documentation covering Qlik Sense, associative data engine indexing, Insight Advisor natural language search, and hybrid cloud deployment [16].

B. Capability Dimensions and Operational Indicators

To evaluate platform capabilities systematically, eight core dimensions were established as outlined in Table 2.

Table 2: Capability Dimensions and Operational Indicators

Dimension	Operational Indicators
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Data Integration	Native database connectors; cloud data warehouse integration; REST APIs; flat file support; streaming data support.
Data Preparation	ETL/ELT data transformation pipelines; data cleaning; blending; profiling; automated data quality assurance.
Data Modeling	Semantic modeling; relationship definitions; DAX/calculated columns; multidimensional/associative logic; model reuse.
Visualization	Chart library breadth; dashboard interactivity; filtering/drill-down; geospatial mapping; visual storytelling.
AI Analytics	Automated anomaly detection; predictive forecasting; Machine Learning (ML) integrations; automated insight generation.
Natural Language (NLP)	Natural language query processing; conversational interface; question-to-visualization mapping; semantic parsing.
Collaboration	Dashboard sharing; row/column-level permissions; contextual commenting; automated distribution; messaging integrations.
Deployment	Cloud SaaS; on-premises server; mobile responsiveness; embedded analytics APIs; security administration.

C. Evidence-Based Coding and Weighting Framework

Each platform is coded using a discrete three-level scoring system: High (5 points) indicates complete, native support across operational indicators; Medium (3 points) represents substantial support with minor functional constraints; and Basic (1 point) denotes restricted capability. To reflect real-world enterprise requirements, criteria are weighted based on the analytical lifecycle: Data Integration (15%), Data Modeling (15%), Visualization (15%), and AI Analytics (15%) constitute primary analytical pillars (summing to 60%), while Data Preparation (10%), NLP (10%), Collaboration (10%), and Deployment (10%) represent core supporting dimensions (summing to 40%).

For platform p , the Weighted Capability Index (WCI) is computed as:

$$WCI(p) = \sum_{i=1}^8 [s(p, i) \times w_i]$$

where $s(p, i)$ denotes the coded score for dimension i and w_i represents the normalized criterion weight.

5. EVALUATED BI PLATFORMS

The five evaluated platforms represent major commercial paradigms in self-service, cloud-native, and enterprise analytics. Figure 3 summarizes their overarching three-tier functional architecture across ingestion, core processing, and delivery layers.

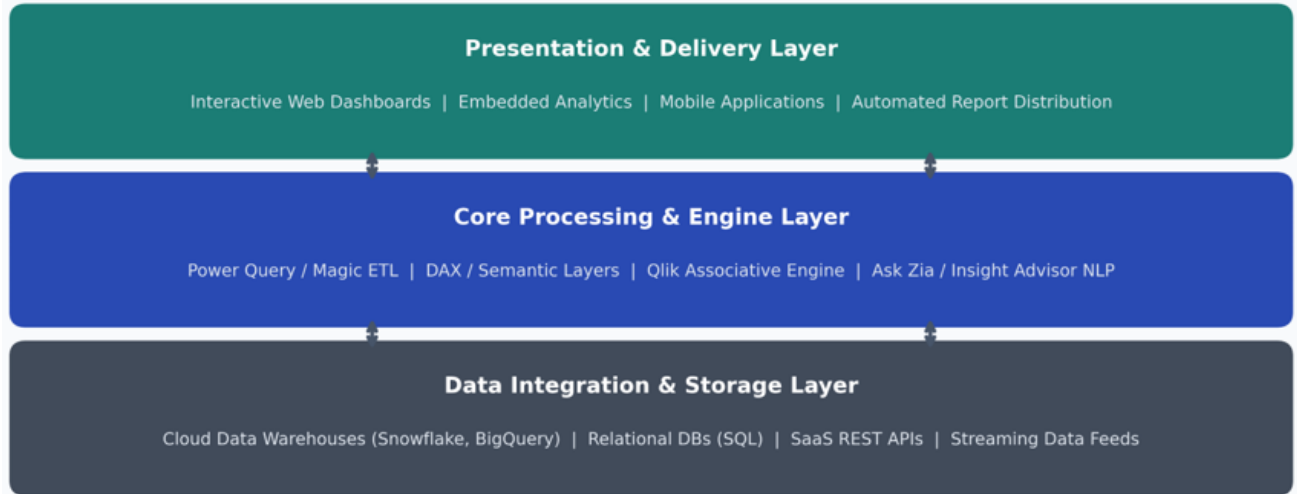


Figure 3: Architecture of Contemporary BI Platforms Across Ingestion, Modeling, and Delivery Layers

A. Zoho Analytics

Delivers a comprehensive cloud BI platform with strong self-service data preparation, Ask Zia conversational querying, and automated predictive narration at a competitive price point [9], [10].

B. Microsoft Power BI

Features seamless Microsoft 365 ecosystem integration, robust Power Query ETL, enterprise DAX semantic modeling, and Q&A natural-language visuals [11].

C. Tableau

Offers industry-leading visual discovery, flexible drag-and-drop design, Tableau Prep data flows, and Ask Data conversational analytics [12]–[14].

D. Domo

Combines cloud-native data ingestion, Magic ETL visual pipelines, AutoML predictive modeling, and extensive enterprise collaboration tools [15].

E. Qlik

Powered by a unique associative data engine that indexes data relationships dynamically without rigid query structures, supported by Insight Advisor NLP [16].

6. COMPARATIVE CAPABILITY ASSESSMENT

Table 3 presents the baseline 3-level evidence-based coding matrix across all five platforms and eight dimensions.

Table 3: Baseline Capability Assessment Matrix (High=5, Medium=3, Basic=1)

Dimension	Weight	Zoho	Power BI	Tableau	Domo	Qlik
Data Integration	15%	5	5	5	5	5
Data Preparation	10%	5	5	3	5	5

Data Modeling	15%	3	5	3	3	5
Visualization	15%	5	5	5	5	5
AI Analytics	15%	5	5	3	5	5
Natural Language (NLP)	10%	5	5	3	5	3
Collaboration	10%	5	5	3	5	3
Deployment	10%	3	5	5	5	5

7. WEIGHTED CAPABILITY RESULTS

Applying the WCI equation yields mathematically verified aggregate baseline scores: Microsoft Power BI (5.00/5.00), Domo (4.70/5.00), Qlik (4.60/5.00), Zoho Analytics (4.50/5.00), and Tableau (3.80/5.00). Figure 4 illustrates the comparative score distribution.

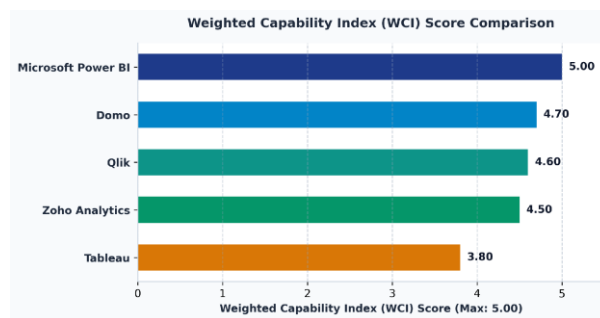


Figure 4: Five-Platform Weighted Overall Score Comparison

Power BI achieves a maximum score of 5.00 due to High ratings across all eight capability dimensions. Domo places second (4.70) with High scores in seven dimensions, receiving Medium (3) only in Data Modeling due to its cloud ETL focus over complex native semantic relationship layers. Qlik ranks third (4.60) backed by its associative modeling and integration. Zoho Analytics scores fourth (4.50) with strong AI/NLP features, while Tableau ranks fifth (3.80) due to lighter native preparation, AI, and collaboration integration relative to full-suite competitors.

8. SENSITIVITY ANALYSIS

To test index robustness against shifts in analytical priorities, sixteen sensitivity scenarios were conducted by perturbing each criterion weight by ± 5 percentage points (± 0.05) while proportionally rescaling remaining weights. Table 4 details the resulting scores and ranking orders.

Table 4: Sensitivity Analysis Scenarios and Ranking Stability

Criterion	Change	Zoho	P.BI	Tab.	Domo	Qlik	Rank Order
Data Integration	-5 pp	4.471	5.000	3.729	4.682	4.576	P.BI > Domo > Qlik > Zoho > Tab.
Data Integration	+5 pp	4.529	5.000	3.871	4.718	4.624	P.BI > Domo > Qlik > Zoho > Tab.
Data Preparation	-5 pp	4.472	5.000	3.844	4.683	4.578	P.BI > Domo > Qlik > Zoho > Tab.

Data Preparation	+5 pp	4.528	5.000	3.756	4.717	4.622	P.BI > Domo > Qlik > Zoho > Tab.
Data Modeling	-5 pp	4.588	5.000	3.847	4.800	4.576	P.BI > Domo > Zoho > Qlik > Tab.
Data Modeling	+5 pp	4.412	5.000	3.753	4.600	4.624	P.BI > Qlik > Domo > Zoho > Tab.
Visualization	-5 pp	4.471	5.000	3.729	4.682	4.576	P.BI > Domo > Qlik > Zoho > Tab.
Visualization	+5 pp	4.529	5.000	3.871	4.718	4.624	P.BI > Domo > Qlik > Zoho > Tab.
AI Analytics	-5 pp	4.471	5.000	3.847	4.682	4.576	P.BI > Domo > Qlik > Zoho > Tab.
AI Analytics	+5 pp	4.529	5.000	3.753	4.718	4.624	P.BI > Domo > Qlik > Zoho > Tab.
NLP	-5 pp	4.472	5.000	3.844	4.683	4.689	P.BI > Qlik > Domo > Zoho > Tab.
NLP	+5 pp	4.528	5.000	3.756	4.717	4.511	P.BI > Domo > Zoho > Qlik > Tab.
Collaboration	-5 pp	4.472	5.000	3.844	4.683	4.689	P.BI > Qlik > Domo > Zoho > Tab.
Collaboration	+5 pp	4.528	5.000	3.756	4.717	4.511	P.BI > Domo > Zoho > Qlik > Tab.
Deployment	-5 pp	4.583	5.000	3.733	4.683	4.578	P.BI > Domo > Zoho > Qlik > Tab.
Deployment	+5 pp	4.417	5.000	3.867	4.717	4.622	P.BI > Domo > Qlik > Zoho > Tab.

A. Sensitivity Finding

Power BI consistently maintains rank 1 and Tableau rank 5 across all 16 scenarios. However, rank inversions occur among Domo, Qlik, and Zoho Analytics under specific weight changes (e.g., increasing Data Modeling elevates Qlik to 2nd place, while decreasing Data Modeling raises Zoho Analytics above Qlik). This confirms that mid-tier platform selection depends heavily on organizational priorities.

9. DISCUSSION

The comparative findings demonstrate that while top-tier BI platforms offer broad core functionality, their architectural philosophies differ. Power BI excels in unified enterprise integration within Microsoft environments. Domo provides superior cloud ETL and application creation workflows. Qlik offers exceptional associative data exploration. Zoho Analytics provides high-value AI and conversational features at an accessible cost, while Tableau remains the benchmark for advanced visual graphic customization.

10. CHALLENGES AND LIMITATIONS

Deploying BI platforms involves technical and organizational hurdles. Figure 5 highlights five critical challenge domains identified in this study.

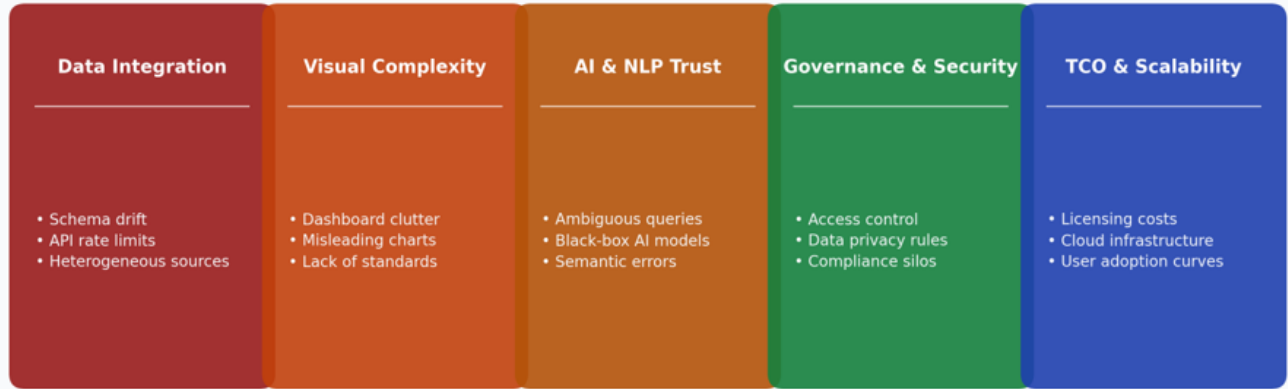


Figure 5: Key Technical and Organizational Challenges in BI Platforms

Main limitations include evidence asymmetry in vendor documentation, qualitative synthesis in 3-level coding, and exclusion of empirical performance metrics such as query execution latency, total cost of ownership (TCO), and admin overhead.

11. FUTURE RESEARCH AND TRENDS

Future research must explore evolving technologies shaping next-generation BI systems, as outlined in Figure 6.

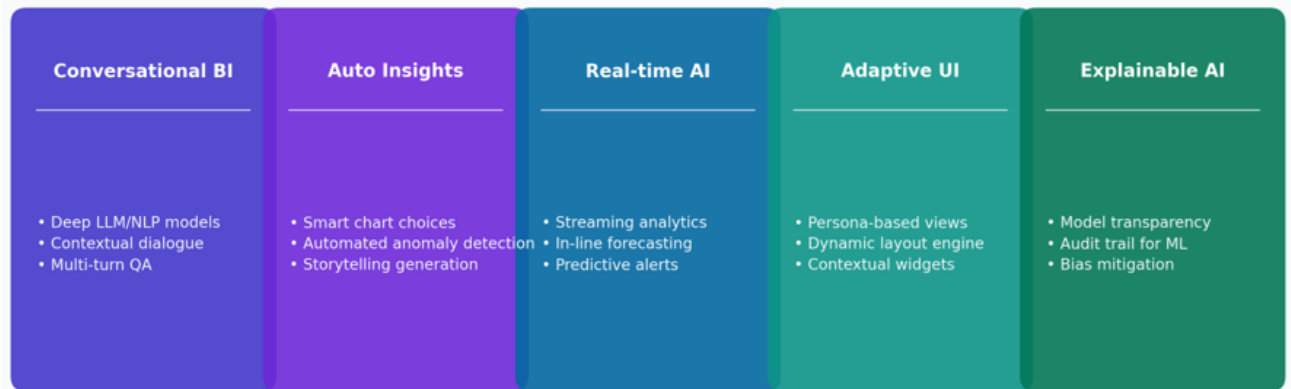


Figure 6: Future Directions and Technological Evolutions in BI

Key future research pillars include deep conversational analytics, automated insight recommendation engines, real-time stream processing, adaptive user interfaces, and explainable AI framework validation.

12. CONCLUSION

This study presented a rigorous, evidence-based comparative capability assessment of Zoho Analytics, Microsoft Power BI, Tableau, Domo, and Qlik. By operationalizing eight capability dimensions, applying a 3-level coding model, calculating a Weighted Capability Index, and conducting sensitivity analysis, the paper provides a reproducible model for evaluating enterprise BI platforms. The findings underscore that platform selection must be aligned with specific architectural priorities rather than relying solely on aggregate scores.

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